

REMARKS***Summary of the Amendment***

Upon entry of the above amendment, claim 2 will have been amended. Accordingly, claims 1, 2, 4, - 27, and 29 - 60 remain currently pending. However, as claims 4 - 10, 37, 40, and 42 - 60, directed to the subject matter of the non-elected species or invention, remain withdrawn from consideration, only claims 1, 2, 11 - 27, 29 - 36, 38, 39, and 41 are currently under consideration.

Summary of the Official Action

In the instant Office Action, the Examiner has objected to the specification and claims, and has rejected the pending claims over the art of record. By the present amendment and remarks, Applicants submit that the objections and rejections have been overcome, and respectfully request reconsideration of the outstanding Office Action and allowance of the present application.

Traversal of Objection to Specification

Applicants note that, as the instant response requests rejoinder of the claims directed to the non-elected invention, and as rejoinder is proper in that the non-elected invention is directed to a process of producing the patentable elastic roller, amending the title and abstract is not warranted.

Accordingly, Applicants request that the Examiner reconsider and withdraw the objection to the specification and indicate that the Title of the Invention and the Abstract are

in accordance with the rules of the U.S. Patent and Trademark Office.

Objection to Claims is Moot

By the present amendment, claim 2 has been amended to clarify that the metallic filler comprise metal fibers. Thus, Applicants submit that the asserted redundancy in the claims has been addressed and overcome by this amendment.

Accordingly, Applicants request that the Examiner reconsider and withdraw the objection to claim 2 and indicate that this claim is in compliance with the Patent Office rules.

Traversal of Rejection Under 35 U.S.C. § 103(a)

1. Over the AAPA in view of Eddy

Applicants traverse the rejection of claims 1, 2, 11 - 21, 25, 29 - 33, 35, 36, 38, 39, and 41 under 35 U.S.C. § 103(a) as being unpatentable over Applicant's Admitted Prior Art on pages 1 and 2 of the specification [hereinafter "AAPA"] in view of EDDY et al. (U.S. Patent No. 4,321,033) [hereinafter "EDDY"]. The Examiner asserts that AAPA shows the general structure of an elastic roll, but fails to teach metal fillers, thermal conductivity of the fillers in relation to a matrix material, and at least portion of the fillers being metallic fillers arranged to improve thermal conductivity of the elastic coating layer such that heat is dissipated toward the hard roller core and dissipated axially by the hard roller core. However, the Examiner asserts that such features are shown in EDDY, and that it would have been obvious to modify the AAPA to include the features of EDDY. Applicants traverse the Examiner's assertions.

Applicants' independent claim 1 recites, *inter alia*, a hard roller core, an elastic coating layer at an outer side of said hard roller core comprising an elastic matrix material and fillers imbedded in said matrix material, and at least a portion of said fillers comprising metallic fillers arranged to improve *thermal conductivity* of said elastic coating layer such that *heat is dissipated toward the hard roller core and dissipated axially by the hard roller core*, wherein the elastic coating layer has a smooth surface structured and arranged for smoothing paper webs and wherein said elastic roller is formed with a *length within a range of 3 to 12 m* and a *diameter within a range of 450 to 1500 mm* and is *structured to withstand compressive forces of up to 130 N/mm²*. Applicants submit that no proper combination of the AAPA and EDDY renders unpatentable the instant invention.

As noted by the Examiner, Applicants acknowledge that the general construction of an elastic roll is known, i.e., a metal core with an elastic cover. However, the AAPA fails to teach or suggest any of the other subject matter recited in the pending claims.

To address this deficiency of the AAPA, the Examiner has cited EDDY. However, in contrast to the elastic roll of the AAPA, which is directed to a roll in paper production having a length of 3 - 12 meters and a diameter of 450 - 1500 mm, and a withstand of linear forces up to about 600 N/mm and compressive strain up to about 130 N/mm², EDDY is directed to a fusing roller in a printer/copier.

Applicants note that, while the specific size of the fusing roll is not disclosed, those

ordinarily skilled in the art would readily recognize that an element within a printer/copier would not have length of 3 - 12 meters and/or a diameter of 450 - 1500 mm. Moreover, while again silent with regard to the linear forces and compressive strains, EDDY provides no suggestion that the coating on the disclosed fusing roll could withstand the forces and/or strains recited in the pending claims.

Because there is no teaching or suggestion that the coating of EDDY is structured in such a manner that it could withstand the recited linear forces and compressive strains, Applicants submit that it would not have been obvious to modify the elastic roll of the AAPA with the coating of EDDY.

Applicants further note that, as the rolls are intended for wholly distinct operational purposes, it would not have been obvious to modify the AAPA in view of EDDY. In particular, Applicants note that the AAPA discloses an elastic roll in which hot spots have been known to arise due to flexure of the elastic covering against a counter roll. This flexure generates heat that can ultimately destroy the covering. In contrast to the AAPA, Applicants note that EDDY does not identify or address problems arising due to flexure of the covering. In fact, it is not even apparent from EDDY whether there is any flexure of the covering of fusing roll. Thus, Applicants submit that EDDY fails to provide any teaching or suggestion of addressing the problem identified in the AAPA, and certainly fails to suggest the solution found by the inventors.

Further still, Applicants note that, in contrast to the instant invention, the roll of EDDY is specially designed with a heating element within the core to radiate heat outwardly. In fact, EDDY discloses that the roll is constructed so that the thermal conductivity of the brush and elastomeric material is three times the thermal conductivity of the elastomeric material alone. In this manner, a lower temperature can be utilized by the heating element of EDDY in the core, while ensuring the high surface temperature needed to transfer heat to the surfaces of the copier intended to fuse the toner powder image to a support or sheet due to the increasing heat emanating through the arrangement of the brush and elastomeric material.

Because the rolls of AAPA appear to be destroyed by the high heat generated by the flexure of the covering, Applicants submit that it would not have been obvious to modify the AAPA in view of EDDY. Applicants submit that such a modification would intentionally radiate heat outwardly from the core, as taught by EDDY, which would increase the heat at the surface, so as to more rapidly breakdown the elastic covering of the AAPA.

Since the asserted combination of documents would prevent the AAPA from operating in its intended manner, i.e., the breakdown of the elastic coating would be exacerbated by the asserted combination of documents, Applicants submit that it would not have been obvious to modify the AAPA in the manner asserted by the Examiner.

Further, Applicants note that, as EDDY explicitly discloses that the roll is formed to

radiate heat, i.e., increase heat radially outwardly, so that this heat can be transferred to surfaces in the copier to ensure satisfactory fusing of the toner powder image to a support or sheet, EDDY fails to disclose the recited heat dissipation of at least independent claim 1, which draws heat away from its outer surface, i.e., that at least a portion of the fillers, which include metallic fillers, are arranged to improve *thermal conductivity* of said elastic coating layer such that *heat is dissipated toward the hard roller core*. Therefore, even assuming, *arguendo*, that it were obvious to combine the AAPA and EDDY (which Applicants submit it is not), Applicants submit that the heat dissipation of elastic covering of the modified roll would be contrary to the recited features of the instant invention, such that this would not render the invention obvious.

Moreover, as EDDY specifically discloses a heating element within the core in order to supply the heat to radiate outwardly, so as to transfer sufficient heat to the surfaces involved in fusing the toner powder image, Applicants further submit that EDDY fails to provide any teaching that the roll core of EDDY would axially dissipate heat, as recited in the Applicants' claims.

In fact, Applicants submit that EDDY is structured to operate in an exactly opposite manner than the invention recited in at least independent claim 1. That is, EDDY is structured to ensure uniform heat radiating to the outer surface of the fusing roll to heat surfaces of the copier/printer in order to satisfactorily fuse the toner powder image to the

support or sheet, whereas the pending claims recite at least a portion fillers arranged to improve *thermal conductivity* of said elastic coating layer to *dissipate heat toward the hard roller core* and the roller core is provided to *dissipate heat axially*.

Applicants further submit that this heat dissipation is not an intended use of the device, but is a characteristic property of the roll due to its specific construction and arrangement of elements, just as the roll of EDDY is specially constructed to ensure that heat radiates outwardly in order to achieve the desired fusing in the copier/printer. Therefore, Applicants submit that the arrangement of elements for heat dissipation is entitled to patentable weight, and must be shown in the applied art in order to anticipate the instant invention.

In view of the foregoing, Applicants submit that no proper combination of the AAPA and EDDY teaches or suggest at least a portion of said fillers comprising metallic fillers arranged to improve thermal conductivity of said elastic coating layer *such that heat is dissipated toward the hard roller core and dissipated axially by the hard roller core*, as recited in at least independent claim 1.

Accordingly, Applicants submit that no proper combination of the art of record teaches or suggests the combination of features recited in at least independent claim 1. Thus, Applicants submit that this rejection is improper and should be withdrawn.

Further still, Applicants note that EDDY is used in a printer or copier, which is in

stark contrast to the roller of the instant invention. In this regard, the roller of EDDY is arranged to heat surfaces within the copier/printer in order to fuse the toner powder image onto a support or sheet and, therefore, is not structured or arranged to smooth a paper web. In fact, Applicants note that, as EDDY only discloses that the roll is intended for heating surfaces in the copier/printer for fusing a toner powder image, there is no disclosure that the roll has a smooth surface structured and arranged for smoothing paper webs.

Further, Applicants submit that claims 2, 11 - 21, 25, 29 - 33, 35, 36, 38, 39, and 41 are allowable at least for the reason that these claims depend from allowable base claims and because these claims recite additional features that further define the present invention. In particular, Applicant submits that no proper combination of the AAPA in view of EDDY teaches or suggests, *inter alia*, said hard roller core comprises metal, and wherein said metallic fillers comprise metal, as recited in claim 2; at least a portion of said metallic fillers comprises one of metal fibers, metal rovings, metal-coated fibers, and metal-coated rovings, as recited in claim 11; the at least a portion of said metallic fillers comprises one of metal-coated fibers and metal-coated rovings, as recited in claim 12; fibers of said one of said metal-coated fibers and said metal-coated rovings comprise at least one of carbon and glass, as recited in claim 13; at least a portion of said fibers is aligned in the axial direction, as recited in claim 14; said at least a portion of said fibers comprises a predominant portion of said fibers, as recited in claim 15; at least a portion of said fibers is aligned in the radial

direction, as recited in claim 16; said at least a portion of said fibers comprises a predominant portion of said fibers, as recited in claim 17; at least a portion of said fibers is aligned in statistical distribution, as recited in claim 18; said at least a portion of said fibers comprises a predominant portion of said fibers, as recited in claim 19; said fibers are arranged in one of a fiber layer and radially sequentially arranged fiber layers, as recited in claim 20; at least a portion of said metallic fillers are elastically formed, as recited in claim 21; said metallic fillers are arranged to extend up to a radially outer surface of said elastic matrix material, as recited in claim 25; a portion of said metallic fillers are arranged to extend radially inwardly up to a surface of said hard roller core, as recited in claim 29; a thermal expansion coefficient of said metallic fillers is smaller than a thermal expansion coefficient of said matrix material, as recited in claim 30; said thermal expansion coefficient of said metallic fillers is substantially the same as a thermal expansion coefficient of said hard roller core, as recited in claim 31; said coating layer comprises a functional layer arranged in a radially outwardly region and a connecting layer arranged in a radially inwardly region, wherein said connecting layer is adapted to connect said functional layer to said hard roller core, and wherein said metallic fillers are arranged at least in said functional layer, as recited in claim 32; said matrix material comprises a plastic material, as recited in claim 33; said matrix material comprises a resin-hardener combination, as recited in claim 35; a concentration of said metallic fillers is substantially uniformly distributed within said elastic matrix material, as

recited in claim 36; said metallic fillers comprise at least one of metal fibers and metal coated fibers, as recited in claim 38; a concentration of said metallic fillers increases in a radially inwardly direction toward said hard roller core, as recited in claim 39; and said metallic fillers comprise at least one of metal fibers and metal coated fibers, as recited in claim 41.

Accordingly, Applicants request that the Examiner reconsider and withdraw the rejection of claims 1, 2, 11 - 21, 25, 29 - 33, 35, 36, 38, 39, and 41 under 35 U.S.C. § 102(b) and indicate that these claims are allowable.

2. Over the AAPA in view of Eddy and further in view of Sukenik

Applicants traverse the rejection of claims 22 - 24 under 35 U.S.C. § 103(a) as being unpatentable over AAPA in view of EDDY and further in view of SUKENIK (U.S. Patent No. 3,852,862). The Examiner acknowledges that the AAPA and EDDY fail to disclose additional fillers including at least one of quartz or PTFE, but asserts that it would have been obvious to include such fillers in view of SUKENIK. Applicants traverse the Examiner's assertions.

Applicants note that SUKENIK fails to provide any teaching or suggestion of the subject matter noted above as deficient in the asserted combination of the AAPA and EDDY. In particular, Applicants submit that SUKENIK fails to teach or suggest fillers arranged to improve *thermal conductivity* of said elastic coating layer such that *heat is dissipated toward the hard roller core and dissipated axially by the hard roller core*, and a roller having an

elastic coating with a smooth surface structured and arranged for smoothing a paper web, as recited in at least independent claim 1.

Because the applied documents fail to teach or suggest at least the above-noted features of the invention, Applicants submit that no proper combination of the applied documents can render unpatentable the combination of features recited in at least independent claim 1.

Further, Applicants submit that SUKENIK fails to disclose the requisite motivation or rationale for combining the AAPA and EDDY in the manner asserted by the Examiner, particularly since the AAPA and EDDY are wholly unrelated to each other. Applicants note that SUKENIK fails to provide any teaching or suggestion for modifying the AAPA in any manner that would prevent it from operating in its intended manner, and thus fails to provide any suggestion of modifying the AAPA to radiate heat outwardly as disclosed by EDDY.

Moreover, Applicants note that, as SUKENIK is not directed to a roll for increasing the heating capacity of a roll in the manner of EDDY, it is not apparent whether modifying the AAPA in view of EDDY to include quartz or PTFE fillers would enable the modified roll of AAPA in view of EDDY to operate in its intended manner. Thus, Applicants submit that the asserted combination of the AAPA, EDDY and SUKENIK is improper and should be withdrawn. Still further, even assuming, *arguendo*, that such a modification were proper (which Applicants submit it is not), Applicants submit that it is not apparent that the resulting

roll would render unpatentable the combination of features recited in at least independent claim 1.

Accordingly, Applicants submit that no proper combination of the AAPA in view of EDDY and further in view of SUKENIK can render the instant invention obvious. Further, Applicants submit that claims 22 - 24 are allowable at least for the reason that these claims depend from an allowable base claim and because they recite additional features that further define the present invention. In particular, Applicants submit that no proper combination of the AAPA in view of EDDY and further in view of SUKENIK teaches or suggests, *inter alia*, said elastic layer further comprising additional fillers arranged in said elastic matrix material, as recited in claim 22; said additional fillers comprise fibers including at least one of carbon and glass fibers, as recited in claim 23; and said additional fillers comprise at least one of quartz and PTFE, as recited in claim 24.

Accordingly, Applicants request that the Examiner reconsider and withdraw the rejection of claims 22 - 24 under 35 U.S.C. § 103(a) and indicate that these claims are allowable.

3. *Over the AAPA in view of Eddy and further in view of Brouwer*

Applicants traverse the rejection of claims 26 and 27 under 35 U.S.C. § 103(a) as being unpatentable over AAPA in view of EDDY and further in view of BROUWER (U.S. Patent No. 5,735,388). The Examiner acknowledges that the asserted combination of the

AAPA and EDDY fails to disclose fillers penetrating the outer surface or an outer surface coated with metal, but asserts that it would have been obvious to do so according to the teaching of BROUWER. Applicants traverse the Examiner's assertions.

Applicants note that BROUWER fails to provide any teaching or suggestion of the subject matter noted above as deficient in the asserted modification of the AAPA in view of EDDY. In particular, Applicants submit that BROUWER fails to teach or suggest fillers arranged to improve *thermal conductivity* of said elastic coating layer such that *heat is dissipated toward the hard roller core and dissipated axially by the hard roller core*, and a roller having an elastic coating with a smooth surface structured and arranged for smoothing a paper web, as recited in at least independent claim 1.

Because the applied documents fail to teach or suggest at least the above-noted features of the invention, Applicants submit that no proper combination of the applied documents can render unpatentable the combination of features recited in at least independent claim 1.

Further, Applicants submit that, as BROUWER fails to provide any teaching or suggestion for modifying the AAPA in a manner contrary to its intended manner of operation, i.e., to dissipate heat radially outwardly, there is no motivation or rationale for combining the AAPA and EDDY in the manner asserted by the Examiner.

Moreover, Applicants note that, as BROUWER is not directed to a roll for increasing

the heating capacity of a roll in the manner of EDDY, it would not have been obvious to combine the art of record in the manner asserted by the Examiner. Further, Applicants note that, as BROUWER specifically discloses the surface of the roll is intended to be erose, there is no teaching or suggestion that it would have been obvious to provide such a surface to the roll of the AAPA as modified (albeit improperly) by EDDY, or that the improperly modified AAPA would continue to operate in its intended manner were the erose surface of BROUWER imported into it.

Thus, Applicants submit that the asserted combination of EDDY and BROUWER is improper and should be withdrawn.

Accordingly, Applicants submit that no proper combination of EDDY and BROUWER can render the instant invention obvious. Further, Applicants submit that claims 26 and 27 are allowable at least for the reason that these claims depend from allowable base claims and because these claims recite additional features that further defines the present invention. In particular, Applicants submit that no proper combination of EDDY in view of BROUWER teaches or suggests, *inter alia*, said metallic fillers are arranged to penetrate said radially outer surface, as recited in claim 26; and a radially outer surface of said elastic matrix material is coated with metal, as recited in claim 27.

Accordingly, Applicants request that the Examiner reconsider and withdraw the rejection of claims 26 and 27 under 35 U.S.C. § 103(a) and indicate that these claims are

allowable.

4. Over the AAPA in view of Eddy and further in view of Yamamoto

Applicants traverse the rejection of claim 34 under 35 U.S.C. § 103(a) as being unpatentable over AAPA in view of EDDY and further in view of YAMAMOTO (U.S. Patent No. 4,990,963). The Examiner acknowledges that EDDY fails to disclose the plastic material includes one of thermosetting resin or thermoplastic resin, but asserts that it would have been obvious to modify EDDY to include such features in view of the teachings of YAMAMOTO. Applicants traverse the Examiner's assertions.

Applicants note that YAMAMOTO fails to provide any teaching or suggestion of the subject matter noted above as deficient in the asserted modification of the AAPA in view of EDDY. In particular, Applicants submit that YAMAMOTO fails to teach or suggest fillers arranged to improve *thermal conductivity* of said elastic coating layer such that *heat is dissipated toward the hard roller core and dissipated axially by the hard roller core*, and a roller having an elastic coating with a smooth surface structured and arranged for smoothing a paper web, as recited in at least independent claim 1.

Because the applied documents fail to teach or suggest at least the above-noted features of the invention, Applicants submit that no proper combination of the applied documents can render unpatentable the combination of features recited in at least independent claim 1.

Further, Applicants submit that, as YAMAMOTO fails to provide any teaching or suggestion for modifying the AAPA, as assertedly modified by EDDY, in a manner contrary to its intended manner of operation, i.e., to dissipate heat radially outwardly.

Moreover, Applicants note that, as YAMAMOTO is not directed to a roll similar in general to that of the AAPA, but instead is utilized as an electrostatic latent image carrier, it is not apparent that it would have been obvious to refer to such subject matter to modify the roll of the AAPA. Moreover, as the secondary document are wholly dissimilar from the subject matter of the AAPA, Applicants submit that it would not have been obvious to combine the documents in the manner asserted by the Examiner.

Accordingly, Applicants submit that no proper combination of the AAPA in view of EDDY and further in view of YAMAMOTO can render the instant invention obvious. Further, Applicants submit that claim 34 is allowable at least for the reason that it depends from an allowable base claim and because it recites additional features that further defines the present invention. In particular, Applicants submit that no proper combination of EDDY in view of YAMAMOTO teaches or suggests, *inter alia*, said plastic material comprises one of a thermosetting resin and a thermoplastic material, as recited in claim 34.

Accordingly, Applicants request that the Examiner reconsider and withdraw the rejection of claim 34 under 35 U.S.C. § 103(a) and indicate that this claim is allowable.

Request for Rejoinder of Subject Matter Directed to Non-Elected Species

Applicants request that, as independent claim 1 has been shown to be allowable over the art of record, and as independent claim 1 is generic to each of the identified species of the elected invention, the Examiner rejoin claims 4 - 10, 37, and 40, directed to the subject matter of the non-elected species, and consider the merits of the same.

Further, Applicants request that the Examiner indicate the allowability of claims 4 - 10, 37, and 40 in the next official communication.

Request for Rejoinder of Claims Directed to Non-Elected Invention

By the present amendment, claim 42 has been amended to recite the features of the apparatus in the process of making the apparatus. As the apparatus has been shown to be allowable, Applicants request that the Examiner rejoin claims 42 - 60, directed to the non-elected invention, and consider the merits of the same.

Further, Applicants request that the Examiner indicate the allowability of claims 42 - 60 in the next official communication.

Application is Allowable

Thus, Applicants respectfully submit that each and every pending claim of the present invention meets the requirements for patentability under 35 U.S.C. §§ 102 and 103, and respectfully request the Examiner to indicate allowance of each and every pending claim of the present invention.

Application is Allowable

Thus, Applicants respectfully submit that each and every pending claim of the present

invention meets the requirements for patentability under 35 U.S.C. §§ 102 and 103, and respectfully request the Examiner to indicate allowance of each and every pending claim of the present invention.

Authorization to Charge Deposit Account

The undersigned authorizes the charging of any necessary fees, including any extensions of time fees required to place the application in condition for allowance by Examiner's Amendment, to Deposit Account No. 19 - 0089 in order to maintain pendency of this application.

CONCLUSION

In view of the foregoing, it is submitted that none of the references of record, either taken alone or in any proper combination thereof, anticipate or render obvious the Applicants' invention, as recited in each of claims 1 - 3, 11 - 27, 29 - 36, 38, 39, and 41, as well as claims 4 - 10, 37, and 40, directed to the subject matter of the non-elected species, and claims 42 - 60, directed to the non-elected invention. The applied references of record have been discussed and distinguished, while significant claimed features of the present invention have been pointed out.

Further, any amendments to the claims which have been made in this response and which have not been specifically noted to overcome a rejection based upon the prior art, should be considered to have been made for a purpose unrelated to patentability, and no estoppel should be deemed to attach thereto.

Accordingly, reconsideration of the outstanding Office Action and allowance of the present application and all the claims therein are respectfully requested and now believed to be appropriate.

Respectfully submitted,
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